



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

OPP OFFICIAL RECORD
HEALTH EFFECTS DIVISION
SCIENTIFIC DATA REVIEWS
EPA SERIES 361

February 16, 1999

MEMORANDUM

SUBJECT: Tribufos (074801). Reregistration Case No 2145.
Monte Carlo Acute Dietary Exposure Estimates for Tribufos.
MRID 44709001. DP Barcode D251691.

FROM: Sheila Piper, Chemist *Sheila Piper*
Chemistry & Exposure Branch 1
Health Effects Division (7509C)

THROUGH: Francis B. Suhre, Branch Senior Scientist *Francis B. Suhre*
Chemistry & Exposure Branch 1
Health Effects Division (7509C)

TO: Jess Rowland, Branch Chief
Reregistration Branch 3
Health Effects Division (7509C)

Action Requested

Provide a probabilistic (Monte Carlo) acute dietary risk assessment for the Tribufos Reregistration Eligibility Decision Document (RED; R.Travaglini, D222993, 6/3/98) using revised anticipated residues for cotton, meat and milk food items (S.Law, 9/1/98).

Background

Tolerances for residues of tribuphos are expressed in terms of tribuphos *per se* in/on cotton, milk, meat and meat byproducts of beef, goats, and sheep and published in 40 CFR §180.272.

The maximum theoretical dietary burden for dairy cattle from cotton gin byproducts indicates that the existing tolerance for tribufos residues in milk (0.002 ppm) is too low and should be revised. The recommended tolerance for tribufos residues in milk is 0.01 ppm. Existing tolerances for meat, fat and meat byproducts are 0.02 ppm. HED recommends that the tolerance for fat be increased to 0.03 ppm and the tolerances for meat and meat byproducts remain at 0.02 ppm (S.Law, D253280, 9/1/98). Tribufos residues in milk will only be found in milk-fat solids, therefore, milk-nonfat solids, milk sugar, and milk-based water should not be included in the dietary exposure analysis (S.Knizer, D250061, 10/6/98).

The registrant, Bayer Corporation, provided the Agency a Monte Carlo acute dietary risk analysis for tribufos (1998; MRID 44709001). In response to the previous dietary exposure risk assessment (B.Steinwand 9/29/98), the registrant stated that the Agency's calculations were based on cotton metabolism data (S.Funk, D169854, D179581) instead of actual magnitude of the residue data from field trials. Also, the values used for milk were extrapolated from a goat metabolism study rather than from a dairy cattle study.

The most recent dietary exposure (DEEM) analysis for tribufos (B.Steinward, 9/29/98), identified cottonseed oil as contributing most of the dietary exposure for all commodities having tribufos tolerances. Using all published commodities, the margin of exposure (MOE) values demonstrated no acute concern for all population subgroups except non-nursing infants (<1 yr) at the 99.9th percentile. The exposure estimate for cottonseed oil was refined for percent crop treated, however, tolerance level residues were assumed. Based on previously submitted and reviewed cottonseed processing data, a residue reduction factor for cottonseed oil (and meal) is available. Revised anticipated residues for tribufos are presented below based on these data.

Hazard ID

The Reference Dose (RfD) used in the analysis is 0.001 mg/kg bwt/day, based on a NOAEL of 1 mg/kg/day from an inhibition of plasma and red blood cell cholinesterase activity. For acute dietary risk assessment, HIARC determined that the 10x factor to account for enhanced sensitivity of infants and children (as required by FQPA) should be retained and thus an uncertainty safety factor of 1000 is required (See HIARC Document, J.Rowland, 12/3/97).

Consumption Database

The registrant used Exposure 4® Version 4.01 software, Detailed Distributional Dietary Exposure Analysis from Technical Assessment Systems, Inc. (TAS) to conduct their Monte Carlo analysis. The National Food Consumption Survey (NFCS) utilizing combined data from the 1987-88 and 1989-92, was used for the analysis.

Novigen's DEEM™ software was used to perform the EPA's Monte Carlo analysis. The Monte Carlo simulations used the USDA 1989-92 nationwide Continuing Surveys for Food Intake by Individuals (CSFII) and accumulated exposure to the chemical for each commodity.

Residue Information

Cottonseed:

The registrant, Bayer used the highest average field trial (HAFT) tribufos residue value for cotton undelinted seed (J.Garbus, D244658, 6/16/98). A residue value of 2.82 ppm for cotton undelinted seed with processing concentration factors of 0.029 and 0.009 were used for cottonseed oil (0.082 ppm) and meal (0.025 ppm), respectively (*See Table 1*). HED has no objection to Bayer's use of these residue data for tribufos to conduct their Monte Carlo analysis.

Milk and Meat:

The registrant used a cattle feeding study (C.Eiden, MRID 438216001, 4/1/98) to derive their anticipated residues for meat and milk foodforms. These anticipated residue values were based on livestock dietary burdens calculated from residue data obtained from field trials. A beef cattle dietary burden of 8.89 ppm was used for red meat foodforms (fat, muscle, liver, kidney). This value was calculated based on the HAFT tribufos residue value for cotton undelinted seed (2.82 ppm), cotton gin byproducts (36.39 ppm), and cottonseed meal (2.82 ppm) with the appropriate processing concentration factor (0.009), percent dry matter and percent maximum diet (feedstuffs) corrections applied.

The dairy cattle dietary burden of 4.95 ppm was used for milk. This value was calculated based on average field trial tribufos residue values for cotton undelinted seed (0.683 ppm), cotton gin byproducts (21.389 ppm) and cottonseed meal (0.683) with the appropriate processing concentration factor (0.009), percent dry matter and percent maximum diet (feedstuffs) corrections applied.

The swine dietary burden of 0.004 ppm was used for swine red meat foodforms. Since cottonseed meal is the only livestock feedstuff item listed for swine, the maximum dietary burden was calculated based on the HAFT tribufos residue value for cotton undelinted seed

(2.82 ppm) adjusted with a processing concentration factor (0.009) for cottonseed meal and appropriate percent maximum diet correction applied. Anticipated residues were calculated by multiplying the highest tissue to feed ratio seen for each tissue from the appropriate feeding study by the calculated maximum dietary burden. HED has no objection to Bayer's use of these animal feeding data for tribufos to conduct their Monte Carlo analysis.

Table 1: Residue Data Used by Bayer to Determine a Tier III Monte Carlo Assessment for Tribufos residues in cotton, meat and milk food items.

Food Item	Acute Residue Data Source	Anticipated Residues	% Crop Treated ²	Monte Carlo Distribution ³
Cottonseed meal	Field Trials: HAFT x conc. factor (2.82 x 0.0089)	0.025	35	
Cottonseed oil	Field Trials: HAFT x conc. factor (2.82 x 0.029)	0.082	35	
Milk	Animal Feeding Study: Maximum ppm in diet x tissue-to-feed ratio (4.948 x 0.0004)	0.002	35	Total nz= 35 Total z= 65
Beef-meat byproducts	Animal Feeding Study: Maximum ppm in diet x tissue-to-feed ratio (8.892 x 0.0028)	0.0249	35	Total nz= 35 Total z= 65
Beef-other organ meats	Animal Feeding Study: Maximum ppm in diet x tissue-to-feed ratio (8.892 x 0.0004)	0.0036	35	Total nz= 35 Total z= 65
Beef-dried	Animal Feeding Study: Maximum ppm in diet x tissue-to-feed ratio (8.892 x 0.0002)	0.0018	35	Total nz= 35 Total z= 65
Beef-fat w/o bones	Animal Feeding Study: Maximum ppm in diet x tissue-to-feed ratio (8.892 x 0.0028)	0.0249	35	Total nz= 35 Total z= 65
Beef-kidney	Animal Feeding Study: Maximum ppm in diet x tissue-to-feed ratio (8.892 x 0.0002)	0.0018	35	Total nz= 35 Total z= 65
Beef-liver	Animal Feeding Study: Maximum ppm in diet x tissue-to-feed ratio (8.892 x 0.0004)	0.0036	35	Total nz= 35 Total z= 65
Beef-lean (fat/free) w/o bones	Animal Feeding Study: Maximum ppm in diet x tissue-to-feed ratio (8.892 x 0.0002)	0.0018	35	Total nz= 35 Total z= 65

Pork-meat byproducts	Animal Feeding Study: Maximum ppm in diet x tissue-to-feed ratio (0.004 x 0.0028)	0.000011	35	Total nz= 35 Total z= 65
Pork-fat w/o bones	Animal Feeding Study: Maximum ppm in diet x tissue-to-feed ratio (0.004 x 0.0028)	0.000011	35	Total nz= 35 Total z= 65
Pork-kidney	Animal Feeding Study: Maximum ppm in diet x tissue-to-feed ratio (0.004 x 0.0002)	0.000001	35	Total nz= 35 Total z= 65
Pork-liver	Animal Feeding Study: Maximum ppm in diet x tissue-to-feed ratio (0.004 x 0.0004)	0.000002	35	Total nz= 35 Total z= 65
Pork-lean (fat free) w/o bone	Animal Feeding Study: Maximum ppm in diet x tissue-to-feed ratio (0.004 x 0.0002)	0.000001	35	Total nz= 35 Total z= 65

¹ Tissue-to-tissue ratio was tribufos residues in milk and meat samples taken from the animal feeding studies extrapolated to a 1X feeding level.

² BEAD supplied the estimate of percent crop treated (11/28/97)

³ Total nz= non-zero; Total z= zero

Percent Crop Treated

The registrant's assessment incorporated percent crop treated (%CT) information obtained from EPA's Biological Exposure Assessment Division (BEAD, 11/28/97) and the values are adequate.

Results

HED conducted an In-House Monte Carlo to compare results with Bayer's acute dietary exposure assessment. HED used Bayer's anticipated residue values shown in Table 1. The registrant residue files showed values different than the anticipated residues shown in Table 1 and the RDF files were not indicated if they were used in the Monte Carlo analysis.

Results of Bayer's and EPA's acute dietary risk assessment for tribufos using revised anticipated residues for cotton, meat and milk are summarized below:

Table 2: Acute dietary risk for tribufos using revised anticipated residues for cotton, meat and milk food items; per-capita consumption.

Margin of Exposure (MOEs) at the 99.9th percentile		
Subgroups	Bayer's results using TAS's Exposure4® version 4.01 software	EPA's results using Novigen's DEEM™ software
U.S. Population-All Seasons	18,976	19,917
All Infants (< 1 yr)	17,392	17,620
Nursing Infants (< 1 yr)	NA	20,070
Non-nursing infants (< 1 yr)	17,392	16,748
Children (1-6 yrs)	11,035	11,766
Females (20+ yrs)	NA	38,105
Males (20+ yrs)	28,058	29,880

Conclusion

The Monte Carlo analysis for tribufos using revised anticipated residues for cotton, meat, and milk food items is below HED's level of concern for all the subgroups.

Attachment 1: Monte Carlo analysis for tribufos using anticipated residues for cotton, milk and meat food items.

cc: R.Travalligni (RCAB), A.Overstreet (SRRD), L.Richardson (CEB1), S.Piper, RF, SF, Tribufos List B File
RDI: DRES SAC: 2/16/99: FBSuhre: 2/16/99
7509C: CEB1: CM-2: Rm 810F: 308-2717: Tribufos

U.S. Environmental Protection Agency
 DEEM Acute analysis for TRIBUFOS
 Residue file name: C:\DEEM89\trbuphos.R96 Adjustment factor #2 NOT used.
 Analysis Date 02-12-1999 Residue file dated: 02-10-1999/20:56:40/8
 Reference dose (aRfD) .001 (NOEL) 1 mg/kg body-wt/day

RDF indices and file names for Monte Carlo Analysis

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1 C:\DEEM89\resdata\074801\milk.rdf
2 C:\DEEM89\resdata\074801\befmbyp.rdf
3 C:\DEEM89\resdata\074801\beforg.rdf
4 C:\DEEM89\resdata\074801\befdrid.rdf
5 C:\DEEM89\resdata\074801\beffat.rdf
6 C:\DEEM89\resdata\074801\befkid.rdf
7 C:\DEEM89\resdata\074801\befliv.rdf
8 C:\DEEM89\resdata\074801\beflean.rdf
9 C:\DEEM89\resdata\074801\pormbyp.rdf
10 C:\DEEM89\resdata\074801\porkfat.rdf
11 C:\DEEM89\resdata\074801\porkliv.rdf
12 C:\DEEM89\resdata\074801\porklen.rdf
13 C:\DEEM89\resdata\074801\porkkid.rdf

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Food	Crop		RESIDUE	RDF	Adj. Factors
Code	Grp	Food Name	(ppm)	#	#1 #2
290	O	Cottonseed-oil	002.820000	00.029	00.350
291	O	Cottonseed-meal	002.820000	00.009	00.350
319	D	Milk-fat solids	000.002000	1	01.000 01.000
321	M	Beef-meat byproducts	000.024900	2	01.000 01.000
322	M	Beef-other organ meats	000.003600	3	01.000 01.000
323	M	Beef-dried	000.001800	4	01.920 01.000
324	M	Beef-fat w/o bones	000.024900	5	01.000 01.000
325	M	Beef-kidney	000.001800	6	01.000 01.000
326	M	Beef-liver	000.003600	7	01.000 01.000
327	M	Beef-lean (fat/free) w/o bones	000.001800	8	01.000 01.000
329	M	Goat-other organ meats	000.003600	3	01.000 01.000
335	M	Rabbit	000.001800	4	01.000 01.000
338	M	Sheep-fat w/o bone	000.024900	5	01.000 01.000
341	M	Sheep-lean (fat free) w/o bone	000.001800	4	01.000 01.000
342	M	Pork-meat byproducts	000.000011	9	01.000 01.000
344	M	Pork-fat w/o bone	000.000011	10	01.000 01.000
345	M	Pork-kidney	000.000001	13	01.000 01.000
346	M	Pork-liver	000.000002	11	01.000 01.000
347	M	Pork-lean (fat free) w/o bone	000.000001	12	01.000 01.000
424	M	Veal-fat w/o bones	000.024900	5	01.000 01.000
425	M	Veal-lean (fat free) w/o bones	000.001800	4	01.000 01.000

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 DEEM ACUTE analysis for TRIBUFOS (1989-92 data)
 Residue file name: trbuphos.R96 Adjustment factor #2 used.
 Analysis Date: 02-12-1999/12:10:04 Residue file dated: 02-10-1999/20:56:40/8
 Acute Reference Dose (aRfD) = 0.001000 mg/kg body-wt/day
 NOEL (Acute) = 1.000000 mg/kg body-wt/day
 MC iterations = 1000 MC list in residue file MC seed = 0
 =====

Summary calculations:

	95th Percentile		99th Percentile		99.9th Percentile		
	Exposure % aRfD	MOE	Exposure % aRfD	MOE	Exposure % aRfD	MOE	
U.S. pop - all seasons:							
0.000012	1.22	81992	0.000025	2.46	40608	0.000050	5.02
All infants (<1 year):							19917
0.000008	0.81	123482	0.000026	2.59	38654	0.000057	5.68
Nursing infants (<1 year):							17620
0.000004	0.39	256669	0.000031	3.06	32722	0.000050	4.98
Non-nursing infants (<1 yr):							20070
0.000008	0.82	121946	0.000023	2.30	43435	0.000060	5.97
Children (1-6 years):							16748
0.000026	2.63	38087	0.000046	4.58	21812	0.000085	8.50
Females (13+/nursing):							11766
0.000009	0.85	117093	0.000014	1.36	73481	0.000025	2.46
Females (20+ years/np/nn):							40696
0.000009	0.87	115014	0.000016	1.56	64307	0.000026	2.62
Males (20+ years):							38105
0.000010	1.05	95266	0.000019	1.89	52909	0.000033	3.35
							29880

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 MC iterations = 1000 MC list in residue file MC seed = 0
 =====

U.S. pop - all seasons	Daily Exposure Analysis 1/ (mg/kg body-weight/day)	
	per Capita	per User
Mean	0.000003	0.000003
Standard Deviation	0.000005	0.000005
Margin of Exposure 2/	319,878	315,139
Percent of aRfD	0.31	0.32

Percent of Person-Days that are User-Days = 98.52%

Estimated percentile of user-days exceeding calculated exposure
in mg/kg body-wt/day and corresponding

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000000	0.02	>1,000,000	10.00	0.000008	0.82	121,815
80.00	0.000000	0.04	>1,000,000	5.00	0.000012	1.23	81,584
70.00	0.000001	0.06	>1,000,000	2.50	0.000017	1.68	59,364
60.00	0.000001	0.09	>1,000,000	1.00	0.000025	2.47	40,479
50.00	0.000001	0.13	742,764	0.50	0.000031	3.12	32,012
40.00	0.000002	0.20	507,447	0.25	0.000038	3.84	26,027
30.00	0.000003	0.30	337,950	0.10	0.000050	5.03	19,870
20.00	0.000005	0.47	214,774				

Estimated percentile of per-capita days exceeding calculated exposure
in mg/kg body-wt/day and corresponding

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000000	0.02	>1,000,000	10.00	0.000008	0.82	122,613
80.00	0.000000	0.04	>1,000,000	5.00	0.000012	1.22	81,992
70.00	0.000001	0.06	>1,000,000	2.50	0.000017	1.68	59,608
60.00	0.000001	0.09	>1,000,000	1.00	0.000025	2.46	40,608
50.00	0.000001	0.13	760,056	0.50	0.000031	3.11	32,113
40.00	0.000002	0.19	517,306	0.25	0.000038	3.83	26,101
30.00	0.000003	0.29	343,121	0.10	0.000050	5.02	19,917
20.00	0.000005	0.46	217,155				

1/ Analysis based on all three-day participant records in CSFII 1989-92 survey.

2/ Margin of Exposure = NOEL/ Dietary Exposure.

U.S. Environmental Protection Agency
 DEEM ACUTE analysis for TRIBUFOS
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 Acute Reference Dose (aRfD) = 0.001000 mg/kg body-wt/day
 NOEL (Acute) = 1.000000 mg/kg body-wt/day

Ver. 6.63

(1989-92 data)

Adjustment factor #2 used.

All infants (<1 year)	Daily Exposure Analysis (mg/kg body-weight/day)	
	per Capita	per User
Mean	0.000001	0.000004
Standard Deviation	0.000005	0.000008
Margin of Exposure	766,366	250,978
Percent of aRfD	0.13	0.40

Percent of Person-Days that are User-Days = 32.75%

**Estimated percentile of user-days exceeding calculated exposure
in mg/kg body-wt/day and corresponding**

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000000	0.00	>1,000,000	10.00	0.000011	1.08	92,911
80.00	0.000000	0.00	>1,000,000	5.00	0.000019	1.91	52,327
70.00	0.000000	0.01	>1,000,000	2.50	0.000028	2.78	35,981
60.00	0.000000	0.04	>1,000,000	1.00	0.000040	4.04	24,745
50.00	0.000001	0.08	>1,000,000	0.50	0.000052	5.22	19,148
40.00	0.000002	0.15	652,698	0.25	0.000058	5.80	17,229
30.00	0.000003	0.30	332,558	0.10	0.000066	6.56	15,248
20.00	0.000006	0.57	175,305				

**Estimated percentile of per-capita days exceeding calculated exposure
in mg/kg body-wt/day and corresponding**

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000000	0.00	>1,000,000	10.00	0.000003	0.29	341,521
80.00	0.000000	0.00	>1,000,000	5.00	0.000008	0.81	123,482
70.00	0.000000	0.00	>1,000,000	2.50	0.000015	1.47	67,965
60.00	0.000000	0.00	>1,000,000	1.00	0.000026	2.59	38,654
50.00	0.000000	0.00	>1,000,000	0.50	0.000036	3.60	27,793
40.00	0.000000	0.00	>1,000,000	0.25	0.000046	4.60	21,738
30.00	0.000000	0.00	>1,000,000	0.10	0.000057	5.68	17,620
20.00	0.000000	0.04	>1,000,000				

U.S. Environmental Protection Agency
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 NOEL (Acute) = 1.000000 mg/kg body-wt/day
 =====

Nursing infants (<1 year)	Daily Exposure Analysis (mg/kg body-weight/day)	
	per Capita	per User
Mean	0.000001	0.000009
Standard Deviation	0.000005	0.000012
Margin of Exposure	970,855	116,416
Percent of aRfD	0.10	0.86

Percent of Person-Days that are User-Days = 11.99%

Estimated percentile of user-days exceeding calculated exposure
in mg/kg body-wt/day and corresponding

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000001	0.06	>1,000,000	10.00	0.000026	2.57	38,948
80.00	0.000001	0.07	>1,000,000	5.00	0.000040	4.04	24,761
70.00	0.000001	0.11	899,596	2.50	0.000043	4.31	23,204
60.00	0.000002	0.17	593,850	1.00	0.000050	4.95	20,194
50.00	0.000003	0.30	335,450	0.50	0.000050	5.04	19,825
40.00	0.000004	0.41	244,909	0.25	0.000051	5.08	19,687
30.00	0.000010	0.95	105,239	0.10	0.000051	5.0	19,606
20.00	0.000015	1.47	67,952				

Estimated percentile of per-capita days exceeding calculated exposure
in mg/kg body-wt/day and corresponding

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000000	0.00	>1,000,000	10.00	0.000001	0.07	>1,000,000
80.00	0.000000	0.00	>1,000,000	5.00	0.000004	0.39	256,669
70.00	0.000000	0.00	>1,000,000	2.50	0.000014	1.43	70,059
60.00	0.000000	0.00	>1,000,000	1.00	0.000031	3.06	32,722
50.00	0.000000	0.00	>1,000,000	0.50	0.000041	4.3	24,221
40.00	0.000000	0.00	>1,000,000	0.25	0.000045	4.49	22,285
30.00	0.000000	0.00	>1,000,000	0.10	0.000050	4.98	20,070
20.00	0.000000	0.00	>1,000,000				

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 Acute Reference Dose (aRfD) = 0.001000 mg/kg body-wt/day
 NOEL (Acute) = 1.000000 mg/kg body-wt/day
 =====

Non-nursing infants (<1 yr)		Daily Exposure Analysis (mg/kg body-weight/day)	
		per Capita	per User
Mean		0.000001	0.000003
Standard Deviation		0.000005	0.000007
Margin of Exposure		703,960	292,044
Percent of aRfD		0.14	0.34

Percent of Person-Days that are User-Days = 41.49%

Estimated percentile of user-days exceeding calculated exposure
in mg/kg body-wt/day and corresponding

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000000	0.00	>1,000,000	10.00	0.000009	0.90	111,294
80.00	0.000000	0.00	>1,000,000	5.00	0.000016	1.63	61,371
70.00	0.000000	0.01	>1,000,000	2.50	0.000022	2.21	45,299
60.00	0.000000	0.03	>1,000,000	1.00	0.000038	3.79	26,353
50.00	0.000001	0.07	>1,000,000	0.50	0.000052	5.16	19,362
40.00	0.000001	0.13	757,910	0.25	0.000059	5.92	16,893
30.00	0.000003	0.26	391,558	0.10	0.000068	6.78	14,752
20.00	0.000005	0.52	193,766				

Estimated percentile of per-capita days exceeding calculated exposure
in mg/kg body-wt/day and corresponding

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000000	0.00	>1,000,000	10.00	0.000004	0.41	244,450
80.00	0.000000	0.00	>1,000,000	5.00	0.000008	0.82	121,946
70.00	0.000000	0.00	>1,000,000	2.50	0.000015	1.48	67,594
60.00	0.000000	0.00	>1,000,000	1.00	0.000023	2.30	43,435
50.00	0.000000	0.00	>1,000,000	0.50	0.000036	3.58	27,953
40.00	0.000000	0.00	>1,000,000	0.25	0.000049	4.88	20,477
30.00	0.000000	0.00	>1,000,000	0.10	0.000060	5.97	16,748
20.00	0.000001	0.08	>1,000,000				

U.S. Environmental Protection Agency
 DEEM ACUTE analysis for TRIBUFOS
 Residue file name: trbuphos.R96
 Analysis Date: 02-12-1999/12:10:04 Residue file dated: 02-10-1999/20:56:40/8
 Acute Reference Dose (aRfD) = 0.001000 mg/kg body-wt/day
 NOEL (Acute) = 1.000000 mg/kg body-wt/day
 =====

Children (1-6 years)	Daily Exposure Analysis (mg/kg body-weight/day)	
	per Capita	per User
Mean	0.000007	0.000007
Standard Deviation	0.000010	0.000010
Margin of Exposure	144,660	144,256
Percent of aRfD	0.69	0.69

Percent of Person-Days that are User-Days = 99.72%

Estimated percentile of user-days exceeding calculated exposure
in mg/kg body-wt/day and corresponding

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000001	0.07	>1,000,000	10.00	0.000017	1.75	57,276
80.00	0.000001	0.13	753,246	5.00	0.000026	2.63	38,051
70.00	0.000002	0.20	502,508	2.50	0.000034	3.41	29,338
60.00	0.000003	0.27	368,712	1.00	0.000046	4.59	21,802
50.00	0.000004	0.36	278,973	0.50	0.000056	5.63	17,766
40.00	0.000005	0.47	210,658	0.25	0.000069	6.95	14,396
30.00	0.000007	0.66	152,528	0.10	0.000085	8.50	11,762
20.00	0.000010	0.91	99,482				

Estimated percentile of per-capita days exceeding calculated exposure
in mg/kg body-wt/day and corresponding

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000001	0.07	>1,000,000	10.00	0.000017	1.74	57,344
80.00	0.000001	0.13	761,724	5.00	0.000026	2.63	38,087
70.00	0.000002	0.20	505,814	2.50	0.000034	3.41	29,357
60.00	0.000003	0.27	370,372	1.00	0.000046	4.58	21,812
50.00	0.000004	0.36	279,929	0.50	0.000056	5.63	17,775
40.00	0.000005	0.47	211,238	0.25	0.000069	6.94	14,404
30.00	0.000007	0.65	152,883	0.10	0.000085	8.50	11,766
20.00	0.000010	1.00	99,677				

U.S. Environmental Protection Agency
 DEEM ACUTE analysis for TRIBUFOS
 Residue file name: trbuphos.R96
 Analysis Date: 02-12-1999/12:10:04 Residue file dated: 02-10-1999/20:56:40/8
 Acute Reference Dose (aRfD) = 0.001000 mg/kg body-wt/day
 NOEL (Acute) = 1.000000 mg/kg body-wt/day

Ver. 6.63

(1989-92 data)

Adjustment factor #2 used.

Females (13+/nursing)	Daily Exposure Analysis (mg/kg body-weight/day)	
	per Capita	per User
Mean	0.000002	0.000002
Standard Deviation	0.000003	0.000003
Margin of Exposure	451,947	450,067
Percent of aRfD	0.22	0.22

Percent of Person-Days that are User-Days = 99.58%

Estimated percentile of user-days exceeding calculated exposure
in mg/kg body-wt/day and corresponding

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000000	0.02	>1,000,000	10.00	0.000006	0.57	174,150
80.00	0.000000	0.04	>1,000,000	5.00	0.000009	0.86	116,932
70.00	0.000001	0.05	>1,000,000	2.50	0.000011	1.10	90,634
60.00	0.000001	0.08	>1,000,000	1.00	0.000014	1.36	73,442
50.00	0.000001	0.11	915,220	0.50	0.000017	1.68	59,574
40.00	0.000002	0.16	633,257	0.25	0.000020	2.00	49,957
30.00	0.000002	0.23	437,188	0.10	0.000025	2.46	40,675
20.00	0.000003	0.33	298,695				

Estimated percentile of per-capita days exceeding calculated exposure
in mg/kg body-wt/day and corresponding

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000000	0.02	>1,000,000	10.00	0.000006	0.57	174,453
80.00	0.000000	0.04	>1,000,000	5.00	0.000009	0.85	117,093
70.00	0.000001	0.05	>1,000,000	2.50	0.000011	1.10	90,719
60.00	0.000001	0.08	>1,000,000	1.00	0.000014	1.36	73,481
50.00	0.000001	0.11	920,595	0.50	0.000017	1.68	59,621
40.00	0.000002	0.16	636,533	0.25	0.000020	2.00	49,991
30.00	0.000002	0.23	438,891	0.10	0.000025	2.46	40,696
20.00	0.000003	0.33	299,488				

U.S. Environmental Protection Agency
 DEEM ACUTE analysis for TRIBUFOS
 Residue file name: trbuphos.R96
 Analysis Date: 02-12-1999/12:10:04 Residue file dated: 02-10-1999/20:56:40/8
 Acute Reference Dose (aRfD) = 0.001000 mg/kg body-wt/day
 NOEL (Acute) = 1.000000 mg/kg body-wt/day

Ver. 6.63

(1989-92 data)

Adjustment factor #2 used.

Females (20+ years/np/nm)		Daily Exposure Analysis (mg/kg body-weight/day)	
		per Capita	per User
Mean	0.000002	0.000002	
Standard Deviation	0.000003	0.000003	
Margin of Exposure	478,508	474,994	
Percent of aRfD	0.21	0.21	

Percent of Person-Days that are User-Days = 99.27%

Estimated percentile of user-days exceeding calculated exposure
in mg/kg body-wt/day and corresponding

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000000	0.01	>1,000,000	10.00	0.000006	0.57	174,190
80.00	0.000000	0.03	>1,000,000	5.00	0.000009	0.87	114,723
70.00	0.000000	0.04	>1,000,000	2.50	0.000012	1.16	86,183
60.00	0.000001	0.06	>1,000,000	1.00	0.000016	1.56	64,226
50.00	0.000001	0.09	>1,000,000	0.50	0.000019	1.86	53,905
40.00	0.000001	0.13	795,137	0.25	0.000022	2.16	46,280
30.00	0.000002	0.19	530,310	0.10	0.000026	2.63	38,071
20.00	0.000003	0.31	326,015				

Estimated percentile of per-capita days exceeding calculated exposure
in mg/kg body-wt/day and corresponding

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000000	0.01	>1,000,000	10.00	0.000006	0.57	174,793
80.00	0.000000	0.03	>1,000,000	5.00	0.000009	0.87	115,014
70.00	0.000000	0.04	>1,000,000	2.50	0.000012	1.16	86,342
60.00	0.000001	0.06	>1,000,000	1.00	0.000016	1.56	64,307
50.00	0.000001	0.09	>1,000,000	0.50	0.000019	1.85	53,969
40.00	0.000001	0.12	802,076	0.25	0.000022	2.16	46,328
30.00	0.000002	0.19	534,259	0.10	0.000026	2.62	38,105
20.00	0.000003	0.30	327,884				

U.S. Environmental Protection Agency
 DEEM ACUTE analysis for TRIBUFOS
 Residue file name: trbuphos.R96
 Analysis Date: 02-12-1999/12:10:04 Residue file dated: 02-10-1999/20:56:40/8
 Acute Reference Dose (aRfD) = 0.001000 mg/kg body-wt/day
 NOEL (Acute) = 1.000000 mg/kg body-wt/day
 =====

Males (20+ years)	Daily Exposure Analysis (mg/kg body-weight/day)	
	per Capita	per User
Mean	0.000003	0.000003
Standard Deviation	0.000004	0.000004
Margin of Exposure	365,656	363,728
Percent of aRfD	0.27	0.27

Percent of Person-Days that are User-Days = 99.47%

Estimated percentile of user-days exceeding calculated exposure
in mg/kg body-wt/day and corresponding

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000000	0.02	>1,000,000	10.00	0.000007	0.74	135,788
80.00	0.000000	0.04	>1,000,000	5.00	0.000011	1.05	95,115
70.00	0.000001	0.06	>1,000,000	2.50	0.000014	1.39	71,837
60.00	0.000001	0.09	>1,000,000	1.00	0.000019	1.89	52,860
50.00	0.000001	0.12	820,661	0.50	0.000023	2.32	43,149
40.00	0.000002	0.18	569,729	0.25	0.000028	2.77	36,077
30.00	0.000003	0.26	379,111	0.10	0.000033	3.35	29,861
20.00	0.000004	0.43	234,267				

Estimated percentile of per-capita days exceeding calculated exposure
in mg/kg body-wt/day and corresponding

Perc.	Exposure	% aRfD	MOE	Perc.	Exposure	% aRfD	MOE
90.00	0.000000	0.02	>1,000,000	10.00	0.000007	0.73	136,091
80.00	0.000000	0.04	>1,000,000	5.00	0.000010	1.05	95,266
70.00	0.000001	0.06	>1,000,000	2.50	0.000014	1.39	71,930
60.00	0.000001	0.09	>1,000,000	1.00	0.000019	1.89	52,909
50.00	0.000001	0.12	826,948	0.50	0.000023	2.32	43,191
40.00	0.000002	0.17	573,447	0.25	0.000028	2.77	36,108
30.00	0.000003	0.26	381,138	0.10	0.000033	3.35	29,880
20.00	0.000004	0.43	235,220				

"Tribufos"

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NEWMCH, 0.001

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02-10-1999/20:56:40

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C:\DEEM89\resdata\074801\beffat.rdf
C:\DEEM89\resdata\074801\beffkid.rdf
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290	270030A,O,	2.82	0	0.029	0.35	0	"Cottonseed-oil", ""	
291	27003WA,O,	2.82	0	0.0089	0.35	0	"Cottonseed-meal", ""	
319	50000FA,D,	0.002	1	1	1	0	"Milk-fat solids", ""	
321	530018A,M,	0.0249	2	1	1	0	"Beef-meat byproducts", ""	
322	53001BB,M,	0.0036	3	1	1	0	"Beef-other organ meats", ""	
323	53001DA,M,	0.0018	4	1.92	1	0	"Beef-dried", ""	
324	53001FA,M,	0.0249	5	1	1	0	"Beef-fat w/o bones", ""	
325	53001KA,M,	0.0018	6	1	1	0	"Beef-kidney", ""	
326	53001LA,M,	0.0036	7	1	1	0	"Beef-liver", ""	
327	53001MA,M,	0.0018	8	1	1	0	"Beef-lean (fat/free) w/o bones", ""	
329	53002BB,M,	0.0036	3	1	1	0	"Goat-other organ meats", ""	
335	53004AA,M,	0.0018	4	1	1	0	"Rabbit", ""	
338	53005FA,M,	0.0249	5	1	1	0	"Sheep-", "w/o bone", ""	
341	53005MA,M,	0.0018	4	1	1	0	"Sheep-", " (fat free) w/o bone", ""	
342	53006BA,M,	0.000011	9	1	1	0	"Pork-meat byproducts", ""	
344	53006FA,M,	0.000011	10	1	1	0	"Pork-fat w/o bone", ""	
345	53006KA,M,	0.000001	13	1	1	0	"Pork-kidney", ""	
346	53006LA,M,	0.000002	11	1	1	0	"Pork-Liver", ""	
347	53006MA,M,	0.000001	12	1	1	0	"Pork-lean (fat free) w/o bone", ""	
424	56000FA,M,	0.0249	5	1	1	0	"Veal-fat w/o bones", ""	
425	56000MA,M,	0.0018	4	1	1	0	"Veal-lean (fat free) w/o bones", ""	

Summary of Residue Distribution Files (RDF) listed in C:\DEEM89\trbuphos.R96

RDF #	File Name	N residues w freq's	N residues w/o freq's	N LODs	LOD Value	N Zeros
1	milk.rdf	0	35	0	0	65
2	befmbyp.rdf	0	35	0	0	65
3	beforg.rdf	0	35	0	0	65
4	befdrid.rdf	0	35	0	0	65
5	beffat.rdf	0	35	0	0	65
6	befkid.rdf	0	35	0	0	65
7	befliv.rdf	0	35	0	0	65
8	beflean.rdf	0	35	0	0	65
9	pormbyp.rdf	0	35	0	0	65
10	porkfat.rdf	0	35	0	0	65
11	porkliv.rdf	0	35	0	0	65
12	porklen.rdf	0	35	0	0	65
13	porkkid.rdf	0	35	0	0	65

MILK

TOTALZ = 65

TOTALNZ = 35

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BEFFAT

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BEFKID
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TOTALNZ = 35

BEFLIV

TOTALZ = 65

TOTALNZ = 35

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BEFLEAN
TOTALZ = 65
TOTALNZ = 35

PORMYBP
TOTALZ = 65
TOTALNZ = 35

PORKFAT
TOTALZ = 65
TOTALNZ = 35

PORKLIV
TOTALZ = 65
TOTALNZ = 35

PORKLEN
TOTALZ = 65
TOTALNZ = 35

PORKKID
TOTALZ = 65
TOTALNZ = 35



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R137153

Chemical: Tribuphos

PC Code:
074801

HED File Code: 42000-Exposure Reviews 11000 Chemistry Reviews
Memo Date: 2/16/1999
File ID: DPD251691
Accession #: 000-00-0113

HED Records Reference Center
1/19/2007